

<b>EPA</b> United States Environmental Protection Agency Washington, DC 20460 <b>Work Assignment</b>						Work Assignment Number 2-06				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-D-11-006			Contract Period   04/29/2011   To   03/28/2013 Base                      Option Period Number    1			Title of Work Assignment/SF Site Name ICI Boiler Control Measures				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW K					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance  From   04/30/2012   To   03/28/2013				
Comments: This work assignment includes 100 hours for preparation of the work plan and to begin work on the work assignment. To the best of my knowledge, this work does not duplicate any work previously performed or currently being performed by this office. This document is IAW the CMM 7.3.5.1(D)										
<input type="checkbox"/> Superfund                      Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
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5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:		LOE: 0						
04/29/2011 To 03/28/2013										
This Action:				100						
Total:				100						
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name   David Misenheimer							Branch/Mail Code:			
_____ (Signature)                      (Date)							Phone Number   919-541-5473			
							FAX Number:			
Project Officer Name   Margaret Dougherty							Branch/Mail Code:			
_____ (Signature)                      (Date)							Phone Number: 919-541-2344			
							FAX Number:			
Other Agency Official Name							Branch/Mail Code:			
_____ (Signature)                      (Date)							Phone Number:			
							FAX Number:			
Contracting Official Name   Beverly A. Barbour							Branch/Mail Code:			
_____ (Signature)                      (Date)							Phone Number: 919-541-4095			
							FAX Number: 919-541-0611			

## Statement of Work

**I. Title: Support for ICI Boiler Control Measures**

**Contractor Name: ERG**

**Contract #: EP-D-11-006**

**WA #: 2-06**

**II. Work Assignment Manager (WAM):**

WAM Name: David Misenheimer

U.S. Environmental Protection Agency

OAQPS / HEID (C439-02)

Research Triangle Park, NC 27711

Phone: (919) 541-5473

Alt. WAM Name: Larry Sorrels

U.S. Environmental Protection Agency

OAQPS / HEID (C439-02)

Research Triangle Park, NC 27711

Phone: (919) 541-5041

**III. Background:** When developing regulations, EPA uses control measure information to assess the effectiveness of various control options and to estimate the potential costs. Under a previous Work Assignment earlier in FY12 (Contract EP-D-11-006, Work Assignment # 1-05, "Support for ICI Boiler Control Measures"), ERG prepared NO<sub>x</sub> control measure information for Industrial, Institutional, and Commercial (ICI) Boilers.

The purpose of this Work Assignment (WA) is to develop additional information on control efficiency, cost, and co-impact information on ICI Boilers for NO<sub>x</sub>, SO<sub>2</sub>, and PM controls, as well as energy efficiency options, and to address challenges in the estimation of costs due to missing and unreliable design capacity information in EPA's National Emissions Inventory, to supplement the deliverables of the previous Work Assignment.

**IV. Description and Tasks:**

**Task #1: Work Plan**

The Contractor shall develop a new work plan. The Contractor shall hold conference calls with the WAM on at least a biweekly basis after approval of the work plan to plan and review progress of this WA.

**Task #2: Complete the Work Begun under a Previous Work Assignment re ICI Boiler Control Measures for NOx**

The Contractor shall provide short descriptions (approximately 2-10 sentences) of each of the NOx control measures covered in the previous Work Assignment:

- Low NOx Burners (including the specific technologies that are covered under the term "Low NOx Burner")
- Selective Catalytic Reduction
- Selective Non-Catalytic Reduction
- Flue Gas Recirculation

The Contractor shall advise the WAM on whether Non-Selective Catalytic Reduction (NSCR) is generally applicable to ICI Boilers. If it is applicable, then the Contractor shall investigate the availability of control and cost information for this control measure.

The Contractor shall investigate availability of control and cost information for NOx controls not covered in the previous Work Assignment (see list above) including:

- Ultra Low NOx Burners
- Fuel Switching (e.g., switching from No. 2 Fuel Oil or Residual Oil to Natural Gas or Low Nitrogen Fuel Oil)
- Fuel Reburning (e.g., through Natural Gas Injection)
- Other Combustion Controls (OFA, Staged Combustion, Combustion Optimization)

For the control measures where sufficient information is available, prepare control and cost algorithms or factors for input to EPA's Control Measures Database.

**Deliverables Under Task 2**

- 2a Descriptions of LNB, SCR, SNCR, and FGR control measures
- 2b Documentation of the methodology and inputs used to prepare the data, issues encountered, and resolution of issues
- 2c ICI Boiler control measure information in document format as well as formatted for input to the CMDB

**Task #3: Prepare Information and Procedures to Address the Missing and Unreliable Design Capacity and Other Relevant Data Elements in EPA's National Emissions Inventory**

**Task #3a:** The Contractor shall develop procedures for estimating ICI Boiler control measure emission reductions and costs in cases where emission inventory information is lacking or is unreliable.

**Task #3b:** The Contractor shall improve the completeness and accuracy of the ICI Boiler capacity and control information in the 2008 NEI by matching and importing the

capacity/control information from the ICI Boiler Survey to the 2008 NEI, especially for larger boilers (greater than 250 mmBtu/hr or if possible, greater than 100 mmBtu/hr)

### **Deliverables Under Task 3**

- 3a Documentation of the procedures for estimating reductions and costs where emission inventory information is missing or unreliable
- 3b Database of ICI Boiler Survey design capacity and existing control measure information crosswalked to point source identification information in the 2008 NEI

### **Task #4: Prepare ICI Boiler Control Measure Information for Energy Efficiency Options**

The Contractor shall prepare cost and emission reduction information, including descriptions, factors, and algorithms, for energy efficiency opportunities at ICI boilers (e.g., waste heat recovery, combined heat/power, and energy audits as required for the area source ICI Boiler Rule now under reconsideration by EPA). The Contractor shall advise the WAM on the most likely sources of information for ICI boiler energy efficiency options such as DOE reports, EPA's GHG BACT white paper for ICI boilers, etc.

### **Deliverables Under Task 4**

- 4a Documentation of the cost and reduction information for NO<sub>x</sub>, information on co-impacts on other pollutant emissions including criteria pollutants, HAPs, and GHGs; control measure descriptions; emission reduction and cost factors and algorithms; for ICI Boiler energy efficiency options as well as information formatted for input to the EPA's CMDB

### **Task #5: Prepare ICI Boiler Control Measure Information for SO<sub>2</sub> and PM Controls**

The Contractor shall review recent cost and emissions impact information on ICI Boiler control measures for SO<sub>2</sub> and PM, including, but not limited to:

- November 2008 NESCAUM report (*Applicability and Feasibility of NO<sub>x</sub>, SO<sub>2</sub>, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers*)
- May 2010 OTC/LADCO report (*Evaluation of Control Options for Industrial, Commercial and Institutional (ICI) Boilers, Technical Support Document*)
- EPA/OAQPS/SPPD rule development documents

Emission Reductions and Co-impacts - The Contractor shall use the results of the review to develop emissions reduction (or increase) values for SO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub>, other criteria pollutants, HAPs, and GHGs for each control measure and source group combination.

Cost/Ton values - The Contractor shall develop low, medium, and high (annualized) cost/ton values specific to the various types of ICI Boilers (by fuel type, boiler design, boiler capacity range, or other appropriate boiler characteristics).

Cost Equations - The Contractor shall develop cost equations wherever possible that use boiler characteristics information from the emission inventory where available and where the values are reasonable (boiler capacity, emissions, etc) and provide outputs of:

- Capital cost
- Operating and Maintenance cost
- Total Annualized cost

The Contractor shall develop separate control and cost information for boilers with a control measure already in place where the existing control measure is being replaced by one that is more effective, and also for situations where a new control measure will operate along with the existing control measure.

Where possible, the Contractor shall provide Capital Recovery Factor, equipment life, and interest rate for each specific measure. See the document "Control Strategy Tool Cost Equations Document", to be provided by the WAM, for examples of existing control measure cost equations.

SCCs - The Contractor shall identify the 2008 National Emissions Inventory (NEI) Source Category Codes (SCCs) to which each ICI Boiler control measure applies.

The Contractor shall organize and format all control measure information prepared under this Work Assignment to populate EPA's Control Measures Database (CMDB), to be provided by the WAM. All fields in the CMDB shall be populated for these control measures, where possible and where appropriate.

#### **Deliverables Under Task 5**

- 5a Documentation of the methodology and inputs used to prepare the data, issues encountered, and resolution of issues
- 5b ICI Boiler control measure information in document format as well as formatted for input to the CMDB

#### **V. QA Requirements:**

To identify and eliminate errors introduced during data preparation, the Contractor shall perform quality control (QC) of the data prior to delivering data sets to the WAM. The Contractor shall include a statement in the final report that confirms that the data is appropriate for the intended use. Also, the Contractor shall identify in the final report the sources of the data, any existing quality assurance (QA) information about the data (i.e., QA that was performed at the time the data were originally prepared), and the location of the QA information.

**VI. Deliverables:**

The Contractor shall adhere to the following schedule:

<b>Task</b>	<b>Deliverable</b>	<b>Delivery Schedule</b>
1	Work Plan	20 days after effective date of WA
2	Document results and dataset formatted for input to CMDDB	5 months after effective date of WA

**VII. Reporting Requirements:**

The Contractor shall provide monthly progress reports in accordance with the terms of the contract. The Contractor shall submit work products in electronic as well as hard copy form. In addition, the Contractor shall deliver to the WAM each draft and final report in electronic format that is readable by windows-based word-processing (Microsoft Word 2003), graphics (Microsoft PowerPoint 2003), and spreadsheet (Excel 2003) programs. The Contractor shall also provide electronic copies of reports in PDF format. The Contractor shall provide the control measure data set in Access 2003 or Access 2007 format, whichever is most convenient for the Contractor. The Contractor shall ensure that all electronic work products are free of computer viruses, malware, or spyware.

<b>EPA</b> United States Environmental Protection Agency Washington, DC 20460 <b>Work Assignment</b>						Work Assignment Number 2-06				
						<input type="checkbox"/> Other <input checked="" type="checkbox"/> Amendment Number: 000001				
Contract Number EP-D-11-006			Contract Period   04/29/2011   To   03/28/2013			Title of Work Assignment/SF Site Name				
			Base                      Option Period Number      1			ICI Boiler Control Measures				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW					
Purpose: <input type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input checked="" type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval					Period of Performance  From   04/30/2012   To   03/28/2013					
Comments: The work plan dated 07/11/12 has been reviewed and we concur with the labor mix, technical hours (340), ODCs, total estimated cost \$34,819 and completion date 03/28/12 as specified. This document is IAW the CMM 7.3.5.1 (D).										
<input type="checkbox"/> Superfund                      Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund										
Note: To report additional accounting and appropriations date use EPA Form 1900-69A.										
SFO <input type="checkbox"/> (Max 2)										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
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Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:				LOE: 100				
04/29/2011 To 03/28/2013										
This Action:						240				
Total:						340				
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:		LOE:				
Cumulative Approved:				Cost/Fee:		LOE:				
Work Assignment Manager Name   David Misenheimer						Branch/Mail Code:				
						Phone Number   919-541-5473				
_____ (Signature)                      (Date)						FAX Number:				
Project Officer Name   Margaret Dougherty						Branch/Mail Code:				
						Phone Number: 919-541-2344				
_____ (Signature)                      (Date)						FAX Number:				
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<b>EPA</b> United States Environmental Protection Agency Washington, DC 20460 <b>Work Assignment</b>						Work Assignment Number 2-06				
						<input type="checkbox"/> Other <input checked="" type="checkbox"/> Amendment Number: 000002				
Contract Number EP-D-11-006			Contract Period   04/29/2011   To   03/31/2014 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW					
Purpose: <input type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input checked="" type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance  From   04/30/2012   To   03/31/2013				
Comments: This Work Assignment Change extends the Period of Performance to read:03/31/2013 in accordance with the Period of Performance end date of Option Period I.  This amendment is in accordance with CMM 7.3.5.1 (D)										
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SFO <input type="checkbox"/> Note: To report additional accounting and appropriations date use EPA Form 1900-69A.										
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Contract Period:                      Cost/Fee:                      LOE: 04/29/2011   To   03/31/2014										
This Action:  <hr/>										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:                      Cost/Fee:                      LOE:										
Cumulative Approved:                      Cost/Fee:                      LOE:										
Work Assignment Manager Name   David Misenheimer  <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code: Phone Number   919-541-5473 FAX Number:			
Project Officer Name   Karen C. Watson  <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code: Phone Number: 919-541-3114 FAX Number:			
Other Agency Official Name  <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code: Phone Number: FAX Number:			
Contracting Official Name   Rodney-Daryl Jones  <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code: Phone Number: 919-541-3112 FAX Number:			